

SEQUENCE LISTING

<110> Robbins, Paul D.  
Mi, Zhibao  
Frizzell, Raymond  
Glorioso, Joseph C.  
Gambotto, Andrea

<120> IDENTIFICATION OF PEPTIDES THAT  
FACILITATE UPTAKE AND CYTOPLASMIC AND/OR NUCLEAR TRANSPORT  
OF PROTEINS, DNA AND VIRUSES

<130> AP32573-AAA 072396.0237

<140> TBD  
<141>

<150> 60/151,980  
<151> 1999-09-01

<150> 60/188,944  
<151> 2000-03-13

<160> 99

<170> FastSEQ for Windows Version 4.0

<210> 1  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 1  
Lys Arg Ile Ile Gln Arg Ile Leu Ser Arg Asn Ser  
1 5 10

<210> 2  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>

<223> random peptide library

<400> 2

Lys Arg Ile His Pro Arg Leu Thr Arg Ser Ile Arg  
1 5 10

<210> 3

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 3

Pro Pro Arg Leu Arg Lys Arg Arg Gln Leu Asn Met  
1 5 10

<210> 4

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 4

Pro Ile Arg Arg Arg Lys Lys Leu Arg Arg Leu Lys  
1 5 10

<210> 5

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 5

Arg Arg Gln Arg Arg Thr Ser Lys Leu Met Lys Arg  
1 5 10

<210> 6

<211> 12

<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 6  
Met His Lys Arg Pro Thr Thr Pro Ser Arg Lys Met  
1 5 10

<210> 7  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 7  
Arg Gln Arg Ser Arg Arg Arg Pro Leu Asn Ile Arg  
1 5 10

<210> 8  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 8  
Arg Ile Arg Met Ile Gln Asn Leu Ile Lys Lys Thr  
1 5 10

<210> 9  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 9  
Ser Arg Arg Lys Arg Gln Arg Ser Asn Met Arg Ile  
1 5 10

2002-06-26 2002-06-26

<210> 10  
<211> 12  
<212> PRT  
<213> Artificial Sequence  
  
<220>  
<223> random peptide library  
  
<400> 10  
Gln Arg Ile Arg Lys Ser Lys Ile Ser Arg Thr Leu  
1 5 10  
  
<210> 11  
<211> 12  
<212> PRT  
<213> Artificial Sequence  
  
<220>  
<223> random peptide library  
  
<400> 11  
Pro Ser Lys Arg Leu Leu His Asn Asn Leu Arg Arg  
1 5 10  
  
<210> 12  
<211> 12  
<212> PRT  
<213> Artificial Sequence  
  
<220>  
<223> random peptide library  
  
<400> 12  
His Arg His Ile Arg Arg Gln Ser Leu Ile Met Leu  
1 5 10  
  
<210> 13  
<211> 12  
<212> PRT  
<213> Artificial Sequence  
  
<220>  
<223> random peptide library

2000-03-25 13:00:00  
<400> 13  
Pro Gln Asn Arg Leu Gln Ile Arg Arg His Ser Lys  
1 5 10

<210> 14  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 14  
Pro Pro His Asn Arg Ile Gln Arg Arg Leu Asn Met  
1 5 10

<210> 15  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 15  
Ser Met Leu Lys Arg Asn His Ser Thr Ser Asn Arg  
1 5 10

<210> 16  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 16  
Gly Ser Arg His Pro Ser Leu Ile Ile Pro Arg Gln  
1 5 10

<210> 17  
<211> 12  
<212> PRT

2000-09-09 09:00:00

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 17

Ser Pro Met Gln Lys Thr Met Asn Leu Pro Pro Met  
1 5 10

<210> 18

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 18

Asn Lys Arg Ile Leu Ile Arg Ile Met Thr Arg Pro  
1 5 10

<210> 19

<211> 16

<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 19

Arg Gln Ile Lys Ile Trp Phe Gln Asn Arg Arg Met Lys Trp Lys Lys  
1 5 10 15

<210> 20

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 20

Ala Arg Pro Leu Glu His Gly Ser Asp Lys Ala Thr  
1 5 10

<210> 21  
<211> 11  
<212> PRT  
<213> Artificial Sequence  
  
<220>  
<223> random peptide library

<400> 21  
Tyr Gly Arg Lys Lys Arg Arg Gln Arg Arg Arg  
1 5 10

<210> 22  
<211> 7  
<212> PRT  
<213> Artificial Sequence  
  
<220>  
<223> random peptide library

<400> 22  
Lys Leu Ala Lys Leu Ala Lys  
1 5

<210> 23  
<211> 14  
<212> PRT  
<213> Artificial Sequence  
  
<220>  
<223> random peptide library

<400> 23  
Lys Leu Ala Lys Leu Ala Lys Lys Leu Ala Lys Leu Ala Lys  
1 5 10

<210> 24  
<211> 28  
<212> PRT  
<213> Artificial Sequence  
  
<220>  
<223> random peptide library

```

<400> 24
Arg Arg Gln Arg Arg Thr Ser Lys Leu Met Lys Arg Gly Gly Lys Leu
      1           5           10          15
Ala Lys Leu Ala Lys Lys Leu Ala Lys Leu Ala Lys
      20          25

```

```
<210> 25
<211> 12
<212> PRT
<213> Artificial Sequence
```

<220>  
<223> random peptide library

<400> 25  
His Gly Trp Glx Ile His Gly Leu Leu His Arg Ala  
1 5 10

<210> 26  
<211> 11  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 26  
Ala Val Pro Ala Lys Lys Arg Glx Lys Ser Val  
1 5 10

<210> 27  
<211> 11  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 27  
Pro Asn Thr Arg Val Arg Pro Asp Val Ser Phe  
1 5 10

<210> 28  
<211> 12

2000-09-25 10:00

<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 28  
Leu Thr Arg Asn Tyr Glu Ala Trp Val Pro Thr Pro  
1 5 10

<210> 29  
<211> 13  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 29  
Ser Ala Glu Thr Val Glu Ser Cys Leu Ala Lys Ser His  
1 5 10

<210> 30  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 30  
Tyr Ser His Ile Ala Thr Leu Pro Phe Thr Pro Thr  
1 5 10

<210> 31  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 31  
Ser Tyr Ile Gln Arg Thr Pro Ser Thr Thr Leu Pro  
1 5 10

<210> 32  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 32  
Ala Val Pro Ala Glu Asn Ala Leu Asn Asn Pro Phe  
1 5 10

<210> 33  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 33  
Ser Phe His Gln Phe Ala Arg Ala Thr Leu Ala Ser  
1 5 10

<210> 34  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 34  
Gln Ser Pro Thr Asp Phe Thr Phe Pro Asn Pro Leu  
1 5 10

<210> 35  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 35  
His Phe Ala Ala Trp Gly Gly Trp Ser Leu Val His  
1 5 10

<210> 36  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 36  
His Ile Gln Leu Ser Pro Phe Ser Gln Ser Trp Arg  
1 5 10

<210> 37  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 37  
Leu Thr Met Pro Ser Asp Leu Gln Pro Val Leu Trp  
1 5 10

<210> 38  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 38  
Phe Gln Pro Tyr Asp His Pro Ala Glu Val Ser Tyr  
1 5 10

<210> 39  
<211> 12  
<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 39

Phe Asp Pro Phe Phe Trp Lys Tyr Ser Pro Arg Asp  
1 5 10

<210> 40

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 40

Phe Ala Pro Trp Asp Thr Ala Ser Phe Met Leu Gly  
1 5 10

<210> 41

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 41

Phe Thr Tyr Lys Asn Phe Phe Trp Leu Pro Glu Leu  
1 5 10

<210> 42

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 42

Ser Ala Thr Gly Ala Pro Trp Lys Met Trp Val Arg  
1 5 10

210 43  
211 12  
212 PRT  
213 Artificial Sequence

220  
223 random peptide library

400 43  
Ser Leu Gly Trp Met Leu Pro Phe Ser Pro Pro Phe  
1 5 10

210 44  
211 12  
212 PRT  
213 Artificial Sequence

220  
223 random peptide library

400 44  
Ser His Ala Phe Thr Trp Pro Thr Tyr Leu Gln Leu  
1 5 10

210 45  
211 12  
212 PRT  
213 Artificial Sequence

220  
223 random peptide library

400 45  
Ser His Asn Trp Leu Pro Leu Trp Pro Leu Arg Pro  
1 5 10

210 46  
211 12  
212 PRT  
213 Artificial Sequence

220  
223 random peptide library

2000-03-25 00:00:00

<400> 46  
Ser Trp Leu Pro Tyr Pro Trp His Val Pro Ser Ser  
1 5 10

<210> 47  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 47  
Ser Trp Trp Thr Pro Trp His Val His Ser Glu Ser  
1 5 10

<210> 48  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 48  
Ser Trp Ala Gln His Leu Ser Leu Pro Pro Val Leu  
1 5 10

<210> 49  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 49  
Ser Ser Ser Ile Phe Pro Pro Trp Leu Ser Phe Phe  
1 5 10

<210> 50  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 50  
Leu Asn Val Pro Pro Ser Trp Phe Leu Ser Gln Arg  
1 5 10

<210> 51  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 51  
Leu Asp Ile Thr Pro Phe Leu Ser Leu Thr Leu Pro  
1 5 10

<210> 52  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 52  
Leu Pro His Pro Val Leu His Met Gly Pro Leu Arg  
1 5 10

<210> 53  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 53  
Val Ser Lys Gln Pro Tyr Tyr Met Trp Asn Gly Asn  
1 5 10

2000-02-01 09:52:00 T

<210> 54  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 54  
Asn Tyr Thr Thr Tyr Lys Ser His Phe Gln Asp Arg  
1 5 10

<210> 55  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 55  
Ala Ile Pro Asn Asn Gln Leu Gly Phe Pro Phe Lys  
1 5 10

<210> 56  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 56  
Asn Ile Glu Asn Ser Thr Leu Ala Thr Pro Leu Ser  
1 5 10

<210> 57  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 57

Tyr Pro Tyr Asp Ala Asn His Thr Arg Ser Pro Thr  
1 5 10

<210> 58  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 58  
Asp Pro Ala Thr Asn Pro Gly Pro His Phe Pro Arg  
1 5 10

<210> 59  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 59  
Thr Leu Pro Ser Pro Leu Ala Leu Leu Thr Val His  
1 5 10

<210> 60  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 60  
His Pro Gly Ser Pro Phe Pro Pro Glu His Arg Pro  
1 5 10

<210> 61  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 61  
Thr Ser His Thr Asp Ala Pro Pro Ala Arg Ser Pro  
1 5 10

<210> 62  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 62  
Met Thr Pro Ser Ser Leu Ser Thr Leu Pro Trp Pro  
1 5 10

<210> 63  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 63  
Val Leu Gly Gln Ser Gly Tyr Leu Met Pro Met Arg  
1 5 10

<210> 64  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 64  
Gln Pro Ile Ile Ile Thr Ser Pro Tyr Leu Pro Ser  
1 5 10

<210> 65

<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 65  
Thr Pro Lys Thr Met Thr Gln Thr Tyr Asp Phe Ser  
1 5 10

<210> 66  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 66  
Asn Ser Gly Thr Met Gln Ser Ala Ser Arg Ala Thr  
1 5 10

<210> 67  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 67  
Gln Ala Ala Ser Arg Val Glu Asn Tyr Met His Arg  
1 5 10

<210> 68  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 68  
His Gln His Lys Pro Pro Pro Leu Thr Asn Asn Trp

1 5 10

<210> 69  
<211> 12  
<212> PRT  
<213> Artificial Sequence  
  
<220>  
<223> random peptide library  
  
<400> 69  
Ser Asn Pro Trp Asp Ser Leu Leu Ser Val Ser Thr  
1 5 10

<210> 70  
<211> 12  
<212> PRT  
<213> Artificial Sequence  
  
<220>  
<223> random peptide library  
  
<400> 70  
Lys Thr Ile Glu Ala His Pro Pro Tyr Tyr Ala Ser  
1 5 10

<210> 71  
<211> 12  
<212> PRT  
<213> Artificial Sequence  
  
<220>  
<223> random peptide library  
  
<400> 71  
Glu Pro Asp Asn Trp Ser Leu Asp Phe Pro Arg Arg  
1 5 10

<210> 72  
<211> 12  
<212> PRT  
<213> Artificial Sequence  
  
<220>

<223> random peptide library

<400> 72

His Gln His Lys Pro Pro Pro Leu Thr Asn Asn Trp  
1 5 10

<210> 73

<211> 19

<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 73

Gly Val Val Gly Lys Leu Gly Gln Arg Arg Thr Lys Lys Gln Arg Arg  
1 5 10 15

Gln Lys Lys

<210> 74

<211> 31

<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 74

Gly Arg Arg Thr Lys Lys Gln Arg Arg Gln Lys Lys Pro Pro Arg Tyr  
1 5 10 15  
Met Ile Leu Gly Leu Leu Ala Leu Ala Ala Val Cys Ser Ala Ala  
20 25 30

<210> 75

<211> 14

<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 75

Gly Arg Arg Thr Lys Lys Gln Arg Arg Gln Lys Lys Pro Pro  
1 5 10

<210> 76  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 76  
Met Tyr Arg Pro Pro Ala Ala Asn Val Asp Pro Trp  
1 5 10

<210> 77  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 77  
Ser Ser Pro Pro Pro Asp Leu Thr Thr Arg Thr Pro  
1 5 10

<210> 78  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 78  
Ala Thr Thr Gln Ser Thr Pro Pro Ala Phe His Leu  
1 5 10

<210> 79  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

2000-03-20T  
<400> 79  
Ser Asp Leu Pro His Val Ser Ser Tyr Trp Arg Gly  
1 5 10

<210> 80  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 80  
Thr Thr Thr Gln Phe Met Glu Ile Arg Gln Ser Ala  
1 5 10

<210> 81  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 81  
Gly Lys Thr Trp Lys Ala Ser Asp Glu Asp Trp Thr  
1 5 10

<210> 82  
<211> 11  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 82  
Asp Pro Ala Arg Ile Leu Gly Arg Ile Phe Leu  
1 5 10

<210> 83  
<211> 12  
<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 83

Tyr Asn Leu Gln Pro Thr Thr Ser Ala Arg Pro Thr  
1 5 10

<210> 84

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 84

Ser Leu Lys Thr Pro Thr Thr Ser His Leu Ser Gln  
1 5 10

<210> 85

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 85

Thr Phe Asp Leu Arg Asn Asn Thr His Arg Asn Pro  
1 5 10

<210> 86

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> random peptide library

<400> 86

Ser Val Ser Val Gly Met Lys Pro Ser Pro Arg Pro  
1 5 10

<210> 87  
<211> 4  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 87  
Arg Arg Arg Arg  
1

<210> 88  
<211> 6  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 88  
Arg Arg Arg Arg Arg Arg  
1 5

<210> 89  
<211> 8  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 89  
Arg Arg Arg Arg Arg Arg Arg Arg  
1 5

<210> 90  
<211> 10  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 90  
Arg  
1 5 10

<210> 91  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 91  
Arg  
1 5 10

<210> 92  
<211> 4  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 92  
Lys Lys Lys Lys  
1

<210> 93  
<211> 6  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 93  
Lys Lys Lys Lys Lys Lys  
1 5

<210> 94  
<211> 8  
<212> PRT  
<213> Artificial Sequence

2000-05-08 2000-05-08

<220>  
<223> random peptide library

<400> 94  
Lys Lys Lys Lys Lys Lys Lys Lys  
1 5

<210> 95  
<211> 10  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 95  
Lys Lys Lys Lys Lys Lys Lys Lys Lys  
1 5 10

<210> 96  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 96  
Lys  
1 5 10

<210> 97  
<211> 5  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 97  
Arg Arg Gln Arg Arg  
1 5

<210> 98  
<211> 8  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 98  
Arg Arg Gln Arg Arg Gln Arg Arg  
1 5

<210> 99  
<211> 11  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> random peptide library

<400> 99  
Arg Arg Gln Arg Arg Gln Arg Arg Gln Arg Arg  
1 5 10